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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] Especially this invention relates to the display unit which has improved immobilization with a display panel and a chassis so that it may be suitable for recycle about display units, such as a plasma display panel and a field emission mold display panel (FED).

[0002]

[Description of the Prior Art] A line electrode pair and a train electrode pair are arranged, respectively, a discharge cel is constituted by the inside of the substrate of the pair by which opposite arrangement was carried out through discharge space as a display unit on the intersection of these two electrodes, and the thing using the plasma display panel (PDP is called hereafter.) which displays by making it discharge in each discharge cel is known.

[0003] While supporting a PDP substrate, the chassis which supports the circuit board equipped with the drive circuit which drives PDP is prepared in said tooth-back side of PDP in the interior of equipment at the display unit using this PDP. The function which radiates heat in the heat which combines this chassis with the function as supporter material mentioned above, and is generated from PDP, and cools a PDP substrate is called for.

[0004] Drawing 3 and drawing 4 are the explanatory views showing the outline of the structure in the conventional display unit. Drawing 3 shows the side elevation and drawing 4 shows the top view. In these drawings, PDP1 sticks front-windshield substrate 1A and tooth-back glass substrate 1B through discharge space 1C, and is constituted, and the circuit board 2 for driving this is carried through the chassis 3 to this PDP1.

[0005] A chassis 3 is plate-like part material which thermal conductivity becomes from metals, such as good aluminum, and it connected electrically through the flexible cable 4, and further, PDP1 and the circuit board 2 have fixed it with the pressure sensitive adhesive double coated tape 5 stuck on the outside surface (rear face of PDP1) of tooth-back glass substrate 1B of PDP1, as it is indicated in drawing 4 as a chassis 3 and PDP1.

[0006]

[Problem(s) to be Solved by the Invention] It is made with the product of various kinds [aim at / ask, and especially in home electronics, attaining streamlining of industrial waste collects used products, it decomposes, return glass and metal components to materials, and / in recent years / from a rise of the consciousness to global environment problems, / recycle]. Although it is possible to separate the chassis which consists of metals which consist of a glass substrate, such as a display panel and aluminum, in a display unit, and to aim at recycle, with the conventional structure mentioned above, in order to remove a pressure sensitive adhesive double coated tape, the special exfoliation approach which used a solvent, heating, water pressure, etc. is needed, and there is a problem on which cost increases. Moreover, with the conventional structure mentioned above on the case where a defect arises in a display panel in a production line, or the occasion of repair after product shipment, since it was difficult to separate a display panel and a chassis, there was a problem that a parts-replacement activity could not be done

simply.

[0007] On the other hand, although also making it easy to reduce the adhesive face product which prepared the pressure sensitive adhesive double coated tape, and to exfoliate is considered, in such a case, there is a problem to which the amount of heat transfers from a display panel to a chassis falls by becoming easy to produce a clearance and a clearance being generated between a display panel and a chassis. Moreover, if an adhesive face product is reduced, a temperature gradient will occur in the adhesion section and a non-adhesive area, thermal stress distortion will arise in a display panel, and there is a problem which also affects a display property by this.

[0008] It is proposed in order to solve such a problem, though a required adhesive face product is secured between a display panel and a chassis, exfoliation becomes easy, and this invention aims at offering the display unit which can do the decomposition and the parts-replacement activity for recycle simply.

[0009]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, the display unit by this invention possesses the following descriptions.

[0010] In invention concerning claim 1, it is characterized by adhesion being smaller than the exfoliation force in which are the display unit which two or more pressure sensitive adhesive double coated tapes were made to intervene, and fixed, and said pressure sensitive adhesive double coated tape produces a chassis by distortion of the cross direction by the tension to a longitudinal direction at the rear face of a display panel.

[0011] In invention concerning claim 2, shear adhesive strength of said pressure sensitive adhesive double coated tape is characterized by being two or less [60Ns //cm] a premise [the display unit concerning claim 1 mentioned above].

[0012] In invention concerning claim 3, the base material of said pressure sensitive adhesive double coated tape is characterized by having 300% or more of rate of elongation after fracture a premise [the display unit concerning claim 1 mentioned above].

[0013] In invention concerning claim 4, the edge of said pressure sensitive adhesive double coated tape is characterized by having overflowed into the outside [edge / the edge of said display panel, or / both or either / of said chassis] a premise [the display unit concerning claim 1 mentioned above].

[0014] And this invention equipped with the above-mentioned description acts the following. That is, what is necessary is to secure an adhesive face product and adhesion required of these total, and just to make two or more pressure sensitive adhesive double coated tapes into the structure where it can exfoliate according to an individual, using two or more pressure sensitive adhesive double coated tapes, at the time of exfoliation, in order to make it the structure where it is easy to exfoliate after securing a sufficient adhesive face product and adhesion. This invention carries out the two or more parallel arrangement of the pressure sensitive adhesive double coated tape of predetermined width of face crosswise, generates distortion crosswise by pulling one of this at a time to a longitudinal direction, and enables it to exfoliate each pressure sensitive adhesive double coated tape according to an individual according to the exfoliation force produced by this distortion paying attention to this point.

[0015] If the base material of a pressure sensitive adhesive double coated tape will be formed with the ingredient which is rich in elasticity if it explains concretely, and this is pulled to a longitudinal direction, a base material will be shrunk crosswise by distortion of "the distortion x Poisson's ratio of a longitudinal direction." The pressure sensitive adhesive double coated tape which fixes a display panel and a chassis is made to exfoliate using the exfoliation force (shearing force) generated by distortion of this cross direction. That is, in proportion to that elongation, shrinkage arises crosswise (or the thickness direction), and this distortion makes the adhesion section produce the exfoliation force in the condition of having made two or more pressure sensitive adhesive double coated tapes intervening between the rear face of a display panel, and a chassis, and having fixed both, if that one edge is pulled to a longitudinal direction at the same time a pressure sensitive adhesive double coated tape is extended to a longitudinal direction. Although the exfoliation force at this time (shearing force) serves as a value which multiplied the Young's modulus (modulus of transverse elasticity) of a pressure-sensitive-

adhesive-double-coated-tape base material by distortion of the cross direction, to this exfoliation force, it is setting up weakly total (shear adhesive strength) of the adhesion between the adhesive faces of another side in the adhesion between an adhesive face and a display-panel rear face, and a pressure sensitive adhesive double coated tape and chassis adhesion sides in a pressure sensitive adhesive double coated tape, and it becomes possible to exfoliate a pressure sensitive adhesive double coated tape by the above tension. In practice, exfoliation of a tape is attained by setting the shear adhesive strength of a pressure sensitive adhesive double coated tape as two or less about 60 N/cm.

[0016] Moreover, if there is tensile strength of a pressure-sensitive-adhesive-double-coated-tape base material more than pull strength required for exfoliation, it will become possible to sample a tape, without going out. In practice, when 300% or more of rate of elongation after fracture (have the reinforcement about which a base material is not turned off even if the 3 or more **s of the die length of a radical are extended) is in a pressure-sensitive-adhesive-double-coated-tape base material, it becomes possible to sample a pressure sensitive adhesive double coated tape from between a display panel and chassis.

[0017] Furthermore, tension of a pressure-sensitive-adhesive-double-coated-tape edge can be easily performed in the condition of having made two or more pressure sensitive adhesive double coated tapes intervening between the rear face of a display panel, and a chassis, and having fixed both, by protruding and arranging the edge of a pressure sensitive adhesive double coated tape in an outside [edge / the edge of a display panel, or / both or either / of a chassis].

[0018]

[Embodiment of the Invention] Hereafter, the example of this invention is explained with reference to a drawing (the explanation which gave the same number to the part same in addition as the former, and overlapped in part is omitted.).

[0019] Drawing 1 and drawing 2 are the explanatory views showing the structure of the display unit concerning one example of this invention, drawing 1 shows a top view and drawing 2 shows the side elevation. The display unit of illustration is equipped with PDP1 which stuck front-windshield substrate 1A and tooth-back glass substrate 1B, and constituted them through discharge space 1C, makes two or more pressure sensitive adhesive double coated tapes 50 a chassis 3 intervene at the rear face, and fixes. A chassis 3 consists of metals, such as aluminum, and it is constituted so that the whole rear face of a tooth-back glass substrate may be covered at least. The whole surface has become flat [the near field which PDP1 of a chassis 3 fixes], and the radiation fin which consists of sheet metal is prepared in the field of another side (illustration abbreviation). Moreover, although illustration was omitted, the circuit board which constitutes the drive circuit which drives PDP1 like the conventional example is attached in a chassis 3, and this circuit board and PDP1 are electrically combined by the flexible cable.

[0020] In such a display unit, the pressure sensitive adhesive double coated tape 50 for fixing a chassis 3 at the rear face of PDP1 is making the gestalt of the shape of a strip of paper which has the die length corresponding to predetermined width of face and the breadth of PDP1, and is carrying out the two or more parallel arrangement of this crosswise. Moreover, in this example, the die length of a pressure sensitive adhesive double coated tape 50 is set up for a long time a little from the breadth of PDP1, and it is changing into the condition that edge 50a of a pressure sensitive adhesive double coated tape 50 overflowed outside from the edge of PDP1 and a chassis 3.

[0021] The pressure sensitive adhesive double coated tape 50 in the above-mentioned example forms an adhesive layer in both sides of the base material which was rich in elasticity, what is equipped with 300% or more of rate of elongation after fracture as a base material including a polymer firing layer or a polymer film layer as preferably as the Young's modulus of thousands psi(s) is suitable, and an acrylic polymer and an acrylic polymer, polyurethane, and especially the thing that combined these are suitable as a polymer firing layer or a polymer film layer. Moreover, as the above-mentioned polymer, it is plastics nature like polypropylene/polyethylene, polyurethane/polyolefine, polyurethane/polycarbonate, and polyurethane/polyester, and is good with the mixture of an elastomeric ingredient. When an above-mentioned base material is used, as for an adhesive layer, a two or less 60 N/cm thing is suitable [an adhesive layer is chosen by relation with the exfoliation force so that it may mention later, but] for shear

adhesive strength.

[0022] Thus, in the constituted display unit, in order to exfoliate PDP1 and a chassis 3, as shown in drawing 1, a tape is pulled towards a longitudinal direction, as one end is held among the pressure sensitive adhesive double coated tapes 50 which have two or more and an arrow head shows. If the pressure sensitive adhesive double coated tape which consists of a base material which was rich in elasticity which was mentioned above is pulled to a longitudinal direction, a big distortion will arise to a longitudinal direction and, also crosswise, distortion (lateral strain) will produce only the part which multiplied by the Poisson's ratio which becomes settled with the property of a base material in the distortion of this longitudinal direction (longitudinal strain) (refer to drawing 1). Moreover, as shown in drawing 2 (b), the same distortion arises also in the thickness direction. The distortion of these cross direction and the thickness direction resists the adhesion of an adhesive layer synthetically, and acts as exfoliation force. That is, the very easy activity of pulling one end of a pressure sensitive adhesive double coated tape enables it to exfoliate a pressure sensitive adhesive double coated tape from between PDP1 and chassis 3 by setting up more greatly than the shear adhesive strength which is the synthetic adhesion limitation of a pressure sensitive adhesive double coated tape the exfoliation force produced by distortion of this cross direction and the thickness direction. In order to acquire sufficient exfoliation force so that clearly from this explanation, it is effective to choose a base material with a big Poisson's ratio.

[0023] Furthermore, it becomes possible to draw out from between PDP1 and chassis 3 by making the base material of a pressure sensitive adhesive double coated tape 50 into what has high tensile strength more than pull strength required for exfoliation, without a tape going out. Moreover, it becomes possible to perform such exfoliation to coincidence smoothly by pulling a pressure sensitive adhesive double coated tape 50 from the both-sides edge only from a single-sided edge of a tape. And separation of PDP1 and a chassis 3 can be easily performed by performing the measures against one pressure sensitive adhesive double coated tape 50 mentioned above to two or more pressure sensitive adhesive double coated tapes 50.

[0024] Although the both ends of a pressure sensitive adhesive double coated tape 50 were protruded from the edge of PDP1 and a chassis 3 and were arranged in the above-mentioned example, only one end could be made to protrude and you could arrange, and when the breadth of PDP1 and a chassis 3 differs, the edge of a pressure sensitive adhesive double coated tape should be just exposed from the edge with the shorter breadth. Thus, by whether the edge of a double-sided tape is protruded and arranged, and it being made to expose, it can hold at the time of pulling and ** can be secured.

[0025] Since according to the example of this invention mentioned above it becomes possible [offering the plasma display equipment which fitted recycle only by choosing the physical property of the pressure sensitive adhesive double coated tape adopted from the former] and a special tool or equipment are not needed for exfoliation, without using an excessive member, it becomes possible to hold down the cost for recycle to minimum. And since it is the easy and soft activity that exfoliation pulls the edge of a pressure sensitive adhesive double coated tape, working efficiency gives a damage neither to PDP nor a chassis by exfoliation highly.

[0026] Furthermore, by arranging densely two or more pressure sensitive adhesive double coated tapes, the heat dissipation nature of a panel is not spoiled and positive immobilization is attained. Moreover, although it is also a joint of an electrode and had not considered as a lamination side with a chassis on problems, such as a rework, until now, the PDP glass edge section which especially thermal stress concentrates is that re-exfoliation is attained simply, becomes possible [sticking to an edge] and also becomes thermal stress relaxation.

[0027] In the above-mentioned example, although the example using PDP as a display panel was shown, this invention is applicable not only to this but other flat display panels, such as an organic electroluminescence display, a liquid crystal display, and FED.

[0028]

[Effect of the Invention] Since this invention is constituted as mentioned above, though a required adhesive face product is secured between a display panel and a chassis, exfoliation becomes easy, and

the decomposition and the parts-replacement activity for recycle can be done simply.

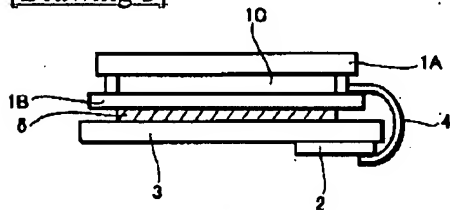
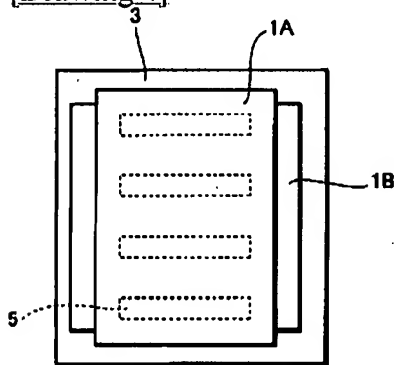
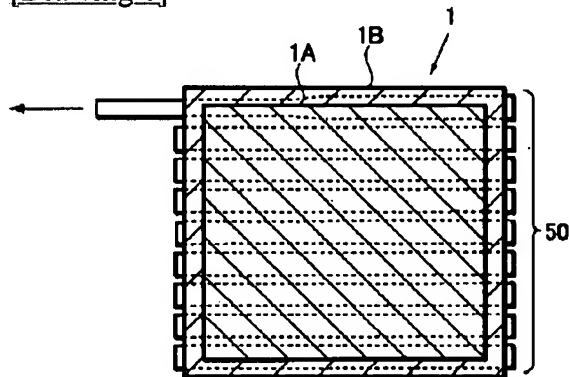
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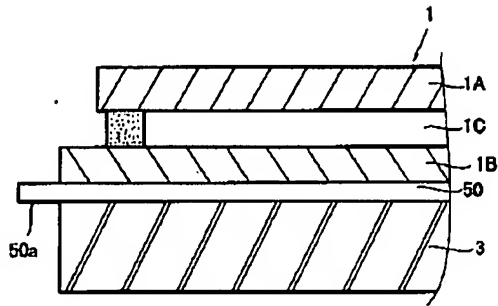
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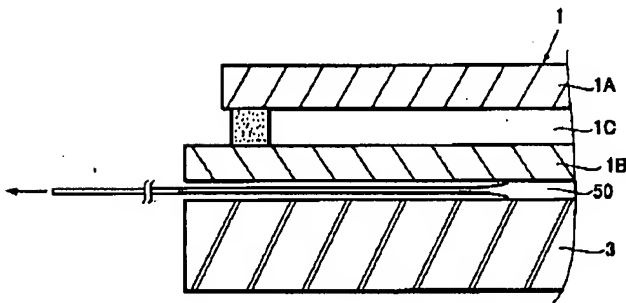
DRAWINGS

[Drawing 3]**[Drawing 4]****[Drawing 1]****[Drawing 2]**

(a)



(b)



[Translation done.]